Title: Socioeconomic differences in takeaway food consumption among adults

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Abbreviations:

SEP – socioeconomic position

FFQ – food frequency questionnaire

AEC – Australian Electoral Commission

AGHE – Australian Guide to Healthy Eating

Abstract

Objective: To examine socioeconomic differences in the frequency and types of takeaway foods consumed.

Design: Cross-sectional postal survey.

Setting: Participants were asked about their usual consumption of overall takeaway food (< four times a month, or ≥ four times a month) and 22 specific takeaway food items (< once a month, or ≥ once a month): these latter foods were grouped into "healthy" and "less healthy" choices. Socioeconomic position was measured using education and equivalised household income and differences in takeaway food consumption were assessed by calculating prevalence ratios using log binomial regression.

Subjects: Adults aged 25–64 years from Brisbane, Australia were randomly selected from the electoral roll (N = 903, 63.7% response rate).

Results: Compared with their more educated counterparts, the least educated were more regular consumers of overall takeaway food, fruit/vegetable juice, and less regular consumers of sushi. For the "less healthy" items, the least educated more regularly consumed potato chips, savoury pies, fried chicken, and non-diet soft drinks; however, the least educated were less likely to consume curry. Household income was not associated with overall takeaway consumption. The lowest income group were more regular consumers of fruit/vegetable juice compared with the highest income group. Among the "less healthy" items, the lowest income group were more regular consumers of fried fish, ice-cream, and milk shakes, while curry was consumed less regularly.

Conclusions: The frequency and types of takeaway foods consumed by socioeconomically disadvantaged groups may contribute to inequalities in overweight/obesity and chronic disease.

Keywords: Socioeconomic, education, household income, takeaway foods, fast-foods

Introduction

The association between socioeconomic position (SEP) and takeaway food has been examined in a number of Australian [1–6] and international studies [7–9]. To date, the findings of this work are mixed, with some studies showing that socioeconomically advantaged groups are more likely to purchase or consume takeaway food [2, 5, 7] whereas others report the opposite [1,4,8,9] or no association [3,6]. This mixed evidence is hindering efforts to better understand dietary inequalities between socioeconomic groups, and ultimately address diet-related risk factors and higher rates of chronic disease among the disadvantaged.

The inconsistent evidence in relation to SEP and takeaway food may be due to the fact that studies have conceptualised and measured takeaway foods in different ways. Most have used measures that reflect the consumption of so-called "fast-foods" such as hamburgers, pizza, chips, and meat pies which are typically purchased from fast-food restaurants, snack bars, or convenience stores [1,3,4,7–10]. Other studies have used a more encompassing definition of takeaway food that includes fast-food and other food-types such as sandwiches, Asian takeaway foods, kebabs, and sushi [2,5,6]. Although there is no standard definition of "takeaway" foods, they include a wide variety of foods that may be more (or less) consistent with dietary recommendations (hereafter termed "healthy" and "less healthy" choices). Socioeconomic groups may differ in their choices of these types of takeaway foods; for example, disadvantaged groups may be more likely to choose "less healthy" options such as hot chips while advantaged groups may select "healthy" options such as sushi. Differences in the nature of takeaway food choices may account for the inconsistent evidence in the findings of studies that examine SEP and takeaway food. Furthermore, different takeaway choices by socioeconomic groups may be reflected in higher intakes of fat and sugar and lower fibre intakes among disadvantaged groups [11] , and thus contribute to inequalities in diet-related chronic disease and associated risk factors such as obesity.

Other factors are limiting our understanding of socioeconomic differences in takeaway food consumption. First, there is a lack of up-to-date information about takeaway consumption among socioeconomic groups in Australia using a more inclusive definition of takeaway foods, with the most recent Australian estimates being derived from the 1995 National Nutrition Survey [2]. The intervening 15 years have been characterised by marked changes in the takeaway and fast-food environment in Australia, with a significant increase in takeaway food sales [12] and product diversification to include healthier takeaway food choices [13]. Given takeaway food has become an increasingly important part of the diet in Australia [2], USA [10] and other countries, examining socioeconomic differences in takeaway consumption, and the types of choices made, is a necessary prelude to addressing diet-related health inequalities.

Second, no known study has examined the reliability of survey items designed to elicit information about takeaway food consumption using a food frequency questionnaire (FFQ), which is one of the most widely used methods of collecting habitual dietary information in epidemiologic research [14]. A number of studies have discussed the reproducibility of FFQs; however, most of these have assessed reproducibility of nutrient intakes rather than intakes of specific food groups [15–17]. Takeaway food consumption is a specific dietary behaviour that can affect nutrient intakes and therefore, dietary quality. Assessing the reliability of self-reported responses to items measuring takeaway food consumption is critical, as self-reports can introduce substantial measurement error which may lead to biased risk estimates [18]. These errors may contribute to the inconsistent findings of studies examining socioeconomic variations in takeaway food consumption. Therefore, reliability assessment is necessary to estimate the quality of takeaway food consumption information collected to determine the reproducibility of peoples' responses [14].

The aim of this study is to examine the association between SEP and takeaway food where "takeaway" is defined as foods or meals that are pre-prepared commercially and require no further preparation by the consumer, and can be consumed immediately after purchase. The takeaway food data were collected in 2009, and consumption patterns are examined on the basis of food-types that reflect the large diversity and "healthiness" of takeaway foods available in contemporary Australia. Further, the study assesses the reliability of people's responses to questions that ask about takeaway food consumption using a test-retest study.

Methods

Ethical approval for this research was obtained from the Queensland University of Technology Human Research Ethics Committee (ID 0900000445).

Participants

This cross-sectional study was conducted in the Brisbane metropolitan area, Australia in 2009. The sampling frame was the electoral roll for the Brisbane Local Government Area and comprised men and women aged between 25 and 64 years. This age group was chosen as takeaway food consumption patterns are likely to be well established by adulthood, and not influenced by transitory life circumstances (e.g. being a student) that characterise younger age groups. Furthermore, individuals' socioeconomic circumstances are established by 25 years of age as education is often completed and they are more likely to be in occupations within their chosen profession. The sample was drawn using a two-step process. First, the Australian Electoral Commission (AEC) randomly selected 20000 individuals residing in the study area, and second, the principal author (K.M) selected 1500 individuals by simple random sampling from the AEC list using a random number generator in SPSS (version 16.0, SPSS Inc., Chicago, Illinois, USA).

Data were collected by a self-administered 16-page mail survey that asked about usual takeaway food consumption patterns and socio-demographic characteristics. The selected participants received questionnaires with postage-paid return envelopes. Up to three contacts were made after the participants received the first survey to maximise the response rate [19]. A total of 903 participants returned the survey (response rate 63.7%). Those who did not report or provide sufficient information on age, education, and takeaway food consumption were excluded (n = 44), which reduced the analytic sample to 859.

Measures

Overall takeaway food consumption

Participants were asked whether they ate any takeaway food in the last 12 months. Response options were: never, rarely, less than once a month, 1–3 three times per month, once a week, 2–4 times per week, 5–6 times per week, and once a day. To characterise participants as frequent takeaway food consumers, these responses were subsequently categorised into two groups: < 4 times per month, and ≥ 4 times per month. This decision was made according to the sample distribution of takeaway food consumption.

Consumption of specific takeaway items

Participants who reported eating takeaway food (n = 841) were asked how often they usually ate each of 22 takeaway items. Similar to the overall takeaway food measure, seven response options ranged from "never or rarely" to "≥ once per day". Initially, these responses were grouped into two groups in the same manner as overall takeaway food; however, small numbers of participants reported consuming some takeaway items ≥ 4 times per month. Consequently, responses for the 22 takeaway items were dichotomised into two groups for analysis: < once per month, and ≥ once a month. The 22 takeaway items were identified from the 1995 National Nutrition Survey and a more recent marketing report as the most-frequently consumed takeaway items in the Australian population [2, 20].

To characterise takeaway food consumption patterns, each of these 22 items were classified as either "healthy" or "less healthy" choices. Similar to a previous study [2], this classification was based on the Australian Guide to Healthy Eating (AGHE) [21] which categorises foods into five core food groups and "extra" foods. The "extra" foods (e.g. cakes, pastry, deep-fried takeaway foods, ice-cream, and non-diet soft-drinks) are a non-essential part of a diet, do not provide many essential nutrients, and are typically high in fat, salt, or sugar. Most of the "less healthy" takeaway items in this study were consistent with the "extra" foods as defined in the AGHE. Nutrient composition data were used to classify foods not identified in the "extra" food list [22,23]. Foods meeting one or more the following criteria were classified as "less healthy": > 2500 kJ of energy per serve; > 3g of saturated fat; < 2g of fibre per serve. Beverages classified as "less healthy" were those containing ≥ 600 kJ of energy per serve and/or > 3g of saturated fat per 100g. Foods or beverages not meeting any of these criteria were considered "healthy" options. This classification resulted in nine "healthy" and 13 "less healthy" items.

Socioeconomic measure

SEP was measured using the respondent's highest completed education qualification and total gross household income. Education was coded as 1) bachelor degree or higher (included graduate diploma or graduate certificate, masters degree or doctorate), 2) diploma, 3) vocational (trade or business certificate), and 4) no post-school qualifications. This educational classification has been used in other Australian studies examining SEP and diet [24,25].

For household income, participants were asked to estimate their total pre-tax household income from 11 pre-defined categories. Equivalised household income was calculated by allocating a weight of 1.0 to the first adult in the household: additional adults thereafter were weighted as 0.5, and children under 18 years were weighted 0.3 [26,27]. Total annual household income was then divided by the number of household income units. Equivalised household income was categorised into quartiles: 1) ≥ $62000, 2) $46501–$61999, 3) $30001–$46500, 4) ≤ $30000.

Test-retest reliability

A separate sample of 100 individuals in the target age range was randomly selected from the electoral roll. These participants received the same survey twice, four weeks apart. Eight individuals did not reside at the same address, 53 replied to the first questionnaire (response rate 57.6%), and 37 participants replied to the second questionnaire (response rate 69.8%). Reliability for the measures of overall takeaway food consumption and consumption of the 22 takeaway items was assessed by the linear weighted kappa statistic [28,29]. The original categories for each measure (eight categories for the consumption of overall takeaway food, and seven categories for the 22 takeaway items) were used to obtain kappa statistics. Interpretation of the kappa coefficient was based on Landis and Koch's classification: ≤ 0 = poor agreement, 0.01–0.20 = slight, 0.21–0.40 = fair, 0.41–0.60 = moderate, 0.61–0.80 = substantial, and 0.81–1.00 = almost perfect agreement [30]. Crude agreement (%) for each measure was also presented as low kappa values can result from skewed distributions (which actually reflect a highly reliable response pattern).

Statistical analyses

Descriptive statistics were used to describe the participant's demographic and takeaway food consumption characteristics. Socioeconomic differences in the consumption of overall takeaway food and the 22 takeaway items were assessed by calculating prevalence ratios and their 95% confidence intervals (CI) using log binomial regression [31, 32]. The highest education and income groups were the referent categories in these analyses. All multivariable analyses were adjusted for age and sex. Bivariate analyses were performed in SPSS (version 18.0.1, SPSS Inc., Chicago, Illinois) and log binomial regression was computed using SAS (version 6.2, SAS Institute, Cary, NC).

Results

Table 1 shows the participants' socio-demographic characteristics. More than 50% of participants were female, and the mean age was 44.2 years. Compared with the Brisbane population [33] the study sample slightly over-represented females, older and more educated groups. Participants in the test-retest reliability study had similar gender proportions to the main study. However, they were slightly younger (mean 43.2 years) with fewer participants from the highest educated and household income groups.

[Table 1 about here]

Frequency of takeaway food consumption

Over one-third (37.7%) of participants reported eating takeaway foods ≥ 4 times per month (Figure 1, Table 2). Among the 22 takeaway items, salads (18.4%) and fruit or vegetable juices (20.9%) were the most frequently consumed "healthy" takeaway items. Potato chips, fries or wedges (14.6%), and non-diet soft drinks (15.9%) were the most frequently consumed "less healthy" takeaway items.

[Figure 1about here][Table 2 about here]

Education differences in takeaway food consumption

The least educated group was significantly more likely to have reported consuming overall takeaway foods ≥ 4 times per month compared with their highly educated counterparts (Table 3). For the individual takeaway items, participants with no post-school and vocational qualifications were less likely to consume sushi and more likely to consume fruit or vegetable juice compared with those having a bachelor degree or higher. Participants with diploma qualifications were more likely to consume kebabs, pasta and diet soft drink, and fruit or vegetable juice compared with those having a bachelor degree or higher. In contrast, most "less healthy" takeaway foods were more likely to be consumed ≥ once a month by lower educated groups although the higher prevalence often did not reach statistical significance. Participants with no post-school qualifications were significantly more likely to consume: potato chips, fries, or wedges; savoury pies, sausage rolls or pastries; fried chicken; non-diet soft drinks; and less likely to consume curry ≥ once a month compared with those having bachelor degree or higher. Participants with vocational and diploma qualifications were also more likely to consume fried chicken compared with those having a bachelor degree or higher.

[Table 3 about here]

Income differences in takeaway food consumption

There was no association between household income and overall takeaway food consumption, and few discernable income differences in the consumption of the individual items (Table 4). For the "healthy" takeaway items, residents of households in the lowest income group were more likely to consume fruit or vegetable juice compared with the highest income group. On the other hand, the second lowest income group was less likely to consume sushi and sandwiches, and the second highest income group was less likely to consume salad compared with the highest income group. For the "less healthy" takeaway items, residents of households in the lowest income group were more likely to report consuming fried fish or seafood; ice-cream, ice-confection, or frozen yoghurt; and thick shakes or milk shakes; and less likely to consume curry compared with the highest income group.

[Table 4 about here]

Test-retest reliability of takeaway food consumption measures

Table 5 presents the reliability estimates for the takeaway food items. Kappa coefficients for overall and three takeaway items had "substantial" agreement. Most takeaway foods (10 "less healthy", and six "healthy" items) had "moderate" agreement, three items had "fair" agreement, and one item had "slight" agreement. All crude percentage agreements exceeded 50% (mean 65.3, SD 7.8, minimum 51.4, maximum 77.8).

[Table 5 about here]

Discussion

Education differences in takeaway food consumption

This study of socioeconomic differences in takeaway food consumption found that lower educated groups consumed takeaway foods more frequently and were more likely to choose "less healthy" options than their higher educated counterparts. This finding was consistent with previous studies that reported lower educated groups were more likely to consume or purchase fast-food [4,8,9]. Similar to our findings, previous Australian research (using data from the most recent Australian National Nutrition Survey in 1995) found the least educated groups were significantly more likely to consume potato chips, non-diet soft drinks, and fried chicken compared with the highly educated group [2]. These items are generally high in fat or sugar and are low in fibre, and can contribute to higher energy intakes [34]. Increased energy intake from eating such takeaway foods, in particular "less healthy" takeaway foods, can lead to over-consumption of energy and saturated fat [35]. Consequently, frequent consumption of these items over a long period of time may influence weight status and increase the risks of development of cardiovascular disease and type 2 diabetes [8].

Contrary to our findings, some studies have reported a reverse association between education and takeaway food consumption or purchasing [2,5] and still others have shown no association [1,3,6]. Inconsistencies in the directions of the associations found in the current and previous studies may be due to differences in the scope of takeaway foods considered (many studies have only focussed on "fast-food"), differences in how education was measured (highest education achieved or age when participants left school), and the type of dietary behaviour examined (i.e. some studies have examined intakes whereas others have examined purchasing behaviour).

Income differences in takeaway food consumption

Previous research has reported that higher income groups are more likely to consume or purchase takeaway or fast-food [3–5,10]. The results of this present study were inconsistent with this earlier work: we found no association between household income and overall takeaway consumption, and limited associations between income and the consumption of "healthy" and "less healthy" takeaway items. In an attempt to understand these results, we further examined the association between household income and takeaway consumption using a number of different analytic approaches. First, the largely null associations may have been attributable to misclassification error: income was measured at the household level and takeaway consumption at the individual level, hence, individuals of low SEP measured on the basis of education (who were more likely to consume less healthy takeaway) may have been classified in the high income category at the household level, thereby weakening associations. To test for this, we de-limited our income analysis to single-person

households which resulted in both the predictor and outcome variables being operationalised at the same (individual) level. Second, takeaway consumption was regressed on household income using different income categories [1) ≤ $25000; 2) $25001–$52000; 3) $52001–$71999; 4) ≥ $72000] to increase the socioeconomic variability between the income groups. Third, we adjusted the association between household income and takeaway consumption for respondent's education to see if the unmeasured effects of this socioeconomic factor were confounding the income-takeaway association. None of these analytic approaches made an appreciable difference to the direction or magnitude of the association between household income and takeaway consumption. In addition, these three analyses did not change the original findings. Based on this evidence we cautiously conclude that in the contemporary Australian context, where the range of inexpensive takeaway foods is extensive, that households differing in their income may not have a measurably different consumption pattern for most types of takeaway food.

Test-retest reliability of takeaway food consumption measures

The present study assessed the reliability of self-reported takeaway food consumption measures and most showed moderate agreement. Although one takeaway item (pasta) exhibited only "slight" agreement (kappa = 0.17), this low coefficient was not necessarily indicative of the measure's poor reliability as kappa is affected by prevalence [36]. For pasta, there was a very high prevalence of responses in the never/rarely group and very low prevalence in the remaining categories which resulted in a low kappa even though the crude agreement was 65.7%. Overall, the guideline for interpretation of kappa [30] indicates the reliability of takeaway food measures were in moderate agreement and supporting their use for population-based dietary research among adults.

Strengths and limitations

The present study has several strengths. First, socioeconomic differences in takeaway food consumption were examined using a more inclusive definition of takeaway food than previous research which has tended to focus on "fast-food". Second, each specific type of takeaway item was examined across socioeconomic groups. Thirdly, this is a population-based study with a moderately high response rate and the sample's socio-demographic characteristics were similar to the target population (i.e. Brisbane residents aged 25–64 years).

A number of limitations of the current study need to be taken into account in the interpretation of the findings. First, there are likely to be variations in nutrient contents within each type of specific takeaway item. The classification of "healthy" or "less healthy" choices was made according to the AGHE [21] and nutrient composition criteria. However, not all items in the "healthy" and "unhealthy" choice categories are actually healthy or unhealthy respectively as there

are variations in nutrient content within each food group [37]. For example, in this study sandwiches are considered a healthy option; however, the nutrient content will vary greatly depending on what the sandwich contains. Additionally, the 22 specific takeaway food choices were not inclusive of all takeaway items sold in Australia. Marked socioeconomic differences may occur in less frequently consumed takeaway items not considered in this study. However, the list comprises the most popular takeaway items in Australia [2] and is therefore, likely to represent the takeaway items contributing to the dietary intakes of most Australians.

Second, this study used self-reported data, measured by a FFQ. This method is prone to bias, especially social desirability bias, given that the items considered as "less healthy" tend to be under reported [38]. Likewise, a postal survey cannot validate who has actually completed the questionnaire or whether they have understood the questions. However, to prevent the latter, the questionnaire was validated with various socioeconomic groups during a pilot study.

Third, while this study achieved a moderately high response rate, 36.7% of those sampled did not respond. Similar to other studies [39,40], disadvantaged groups were under-represented and these are more likely to have adverse health behaviours and risk factors compared with advantaged groups [40]. Therefore, disadvantaged non-respondents to the survey may possibly be consuming takeaway food more frequently than disadvantaged respondents; hence the magnitude of socioeconomic differences in the consumption of takeaway items reported in this study may be underestimated. Additionally, participants were Brisbane residents and are not a representative sample of the Australian population. The findings may not be generalisable especially to non-metropolitan areas where more limited takeaway food options are available. Lastly, this is a cross-sectional study, and therefore, any associations observed cannot be ascribed as causal.

In conclusion, more frequent takeaway food consumption among less educated groups, and especially takeaway food choices that are less consistent with recommendations for good health, may be contributing to higher rates of overweight/obesity and diet-related chronic disease among the socioeconomically disadvantaged. Health promotion programs may be needed to encourage people to choose healthier takeaway food options. Furthermore, policies to reduce access to less healthy options and increase the availability of healthy choices may improve the diet of the whole population, particularly among disadvantaged groups leading to reductions in socioeconomic inequalities in diet-related disease. Further research is required to investigate the factors that may contribute to socioeconomic differences in takeaway food consumption. This study also suggests that self-report measures of takeaway food consumption are acceptably reliable and are suitable for use in population-based dietary research.

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Table 1: Socio-demographic characteristics of participants

	Study sample N = 859	Census *	Test-retest N = 37
Gender (%)			
Male	40.9	49.2	40.5
Females	59.1	50.8	59.5
Age †	44.2 (11.1)	42.7 (11.0)	43.2 (11.6)
Highest completed education (%)			
Bachelor degree or higher	34.8	28.7	21.6
Diploma	12.2	10.0	16.2
Vocational	18.3	19.0	24.3
No post-school qualifications	34.7	42.3 ‡	37.8
Household income § (%)			
≥ $62000	25.6		17.6
$46501–$61999	25.6		29.4
$30001–$46500	23.9		26.5
≤ $30000	24.9		26.5

* Compared with 2006 Census data (Australian Bureau of Statistics 2010).

† Mean (standard deviation).

‡ People who answered 'not applicable' to non-school qualifications.

§ Equivalised household income (AUS $).

Table 2: Frequencies of different types of takeaway item consumption

	n	Takeaway food consumption (%)		
		<1/month	1–3 times /month	≥ 4 times /month
Overall takeaway foods*	859	28.6	33.6	37.7
"Healthy" items				
Fruit or vegetable juice	829	64.4	14.7	20.9
Salad (including fruit salad)	825	66.8	14.8	18.4
Sandwiches	830	56.9	26.5	16.6
Soft drink, diet	820	76.6	7.1	16.3
Sushi	832	76.0	16.7	7.3
Pasta	830	86.1	8.7	5.2
Asian-style noodles	828	83.8	12.6	3.6
Fried rice*	833	86.1	11.2	2.8
Kebab	825	90.9	8.0	1.1
"Less healthy" items				
Soft drink, non-diet	828	73.7	10.4	15.9
Potato chips, fries or wedges*	831	56.6	28.9	14.6
Cakes, sweet buns, muffins or scones	832	66.6	20.4	13.0
Ice-cream, ice-confection, or frozen yoghurt	833	75.3	15.6	9.1
Flavoured milk or smoothie	831	84.6	9.1	6.3
Savoury pies, sausage rolls or pastries*	830	79.6	14.9	5.4
Hamburger	826	76.0	18.8	5.2
Pizza	816	70.1	25.6	4.3
Fried fish or fried seafood	831	77.0	18.7	4.3
Thick shake or milk shake	829	88.7	8.3	3.0
Curry	827	78.6	18.0	3.4
Fried chicken	824	82.6	14.6	2.8
Fried spring roll, dim sim or wonton*	827	90.1	8.5	1.5

* Does not add to 100% as numbers were rounded.

Table 3: Prevalence ratios (PR) and 95% confidence intervals (CI) for differences in takeaway food consumption by education*

	Education			
	Bachelor degree or higher	Diploma	Vocational	No post-school qualifications
Overall takeaway foods (≥ 4 times/month)	1.00	1.17 (0.88-1.56)	1.05 (0.82-1.33)	1.26 (1.03-1.54)
"Healthy" takeaway items (≥ once/month)				
Kebab	1.00	1.94 (1.08-3.46)	1.30 (0.74-2.29)	0.80 (0.45-1.44)
Sandwiches	1.00	1.08 (0.84-1.39)	0.93 (0.75-1.17)	1.09 (0.91-1.30)
Fried rice	1.00	1.23 (0.71-2.12)	1.33 (0.85-2.08)	1.22 (0.81-1.84)
Pasta	1.00	1.69 (1.03-2.76)	1.34 (0.85-2.13)	1.28 (0.86-1.93)
Asian-style noodles	1.00	1.10 (0.69-1.77)	0.90 (0.59-1.39)	0.92 (0.64-1.32)
Sushi	1.00	1.11 (0.82-1.51)	0.58 (0.40-0.85)	0.62 (0.46-0.83)
Salad (including fruit salad)	1.00	1.18 (0.87-1.61)	1.17 (0.90-1.53)	1.10 (0.87-1.38)
Soft drink, diet	1.00	1.60 (1.10-2.31)	1.26 (0.88-1.80)	1.27 (0.94-1.73)
Fruit or vegetable juice	1.00	1.38 (1.03-1.85)	1.36 (1.06-1.75)	1.27 (1.01-1.59)
"Less Healthy" takeaway items (≥ once/month)				
Potato chips, fries, or wedges	1.00	1.19 (0.93-1.52)	1.11 (0.89-1.38)	1.28 (1.08-1.53)
Hamburger	1.00	1.33 (0.94-1.87)	0.97 (0.71-1.33)	1.08 (0.82-1.42)
Pizza	1.00	1.05 (0.76-1.45)	0.75 (0.55-1.02)	1.02 (0.81-1.29)
Savoury pies, sausage rolls or pastries	1.00	0.93 (0.55-1.58)	1.42 (0.99-2.03)	1.67 (1.22-2.27)
Fried fish or fried seafood	1.00	1.08 (0.71-1.65)	1.07 (0.75-1.53)	1.28 (0.96-1.71)
Fried chicken	1.00	2.01 (1.25-3.24)	2.03 (1.36-3.04)	1.70 (1.16-2.52)
Fried spring roll, dim sim, or wonton	1.00	1.45 (0.74-2.81)	1.41 (0.81-2.46)	1.53 (0.93-2.50)
Curry	1.00	0.96 (0.66-1.41)	0.77 (0.55-1.10)	0.60 (0.43-0.84)
Cakes, sweet buns, muffins or scones	1.00	1.09 (0.80-1.49)	0.99 (0.74-1.31)	1.16 (0.93-1.45)
Ice-cream, ice-confection, or frozen yoghurt	1.00	1.31 (0.91-1.88)	1.01 (0.71-1.43)	1.23 (0.93-1.63)
Soft drink, non-diet	1.00	1.25 (0.88-1.77)	1.11 (0.82-1.50)	1.29 (1.01-1.65)
Thick shake or milk shake	1.00	1.33 (0.73-2.44)	1.29 (0.77-2.17)	1.24 (0.78-1.98)
Flavoured milk or smoothie	1.00	1.22 (0.74-2.00)	1.07 (0.69-1.65)	1.03 (0.70-1.52)

* Adjusted by age and sex.

Table 4: Prevalence ratios (PR) and 95% confidence intervals (CI) for differences in takeaway food consumption by household income*

	Equivalised household income (AUS $)			
	≥ $62000	$46501–$61999	$30001–$46500	≤ $30000
Overall takeaway foods (≥ 4 times/month)	1.00	0.91 (0.72-1.16)	0.72 (0.45-1.15)	0.76 (0.48-1.21)
"Healthy" takeaway items (≥ once/month)				
Kebab	1.00	0.54 (0.27-1.08)	0.93 (0.51-1.71)	1.39 (0.80-2.40)
Sandwiches	1.00	0.88 (0.72-1.08)	0.81 (0.65-1.00)	0.87 (0.70-1.07)
Fried rice	1.00	0.83 (0.51-1.34)	0.84 (0.51-1.38)	1.02 (0.64-1.64)
Pasta	1.00	1.08 (0.65-1.79)	1.27 (0.78-2.09)	1.40 (0.86-2.27)
Asian-style noodles	1.00	1.13 (0.75-1.71)	0.70 (0.43-1.15)	1.14 (0.74-1.74)
Sushi	1.00	0.88 (0.65-1.18)	0.69 (0.49-0.97)	0.72 (0.51-1.01)
Salad (including fruit salad)	1.00	0.75 (0.56-0.99)	0.82 (0.62-1.09)	1.06 (0.83-1.37)
Soft drink, diet	1.00	0.93 (0.64-1.33)	0.97 (0.67-1.40)	1.18 (0.83-1.67)
Fruit or vegetable juice	1.00	0.83 (0.64-1.09)	0.81 (0.61-1.08)	1.28 (1.01-1.61)
"Less Healthy" takeaway items (≥ once/month)				
Potato chips, fries, or wedges	1.00	1.04 (0.83-1.30)	1.06 (0.84-1.33)	1.10 (0.88-1.38)
Hamburger	1.00	0.91 (0.67-1.25)	0.86 (0.62-1.20)	0.97 (0.70-1.35)
Pizza	1.00	1.16 (0.89-1.50)	0.96 (0.72-1.28)	0.79 (0.57-1.08)
Savoury pies, sausage rolls or pastries	1.00	0.87 (0.60-1.26)	0.97 (0.68-1.40)	0.99 (0.68-1.42)
Fried fish or fried seafood	1.00	1.10 (0.76-1.58)	0.90 (0.61-1.34)	1.45 (1.03-2.05)
Fried chicken	1.00	0.90 (0.58-1.37)	0.78 (0.49-1.24)	1.26 (0.85-1.88)
Fried spring roll, dim sim, or wonton	1.00	1.09 (0.60-1.97)	1.20 (0.66-2.16)	1.22 (0.67-2.23)
Curry	1.00	0.87 (0.64-1.20)	0.81 (0.58-1.14)	0.44 (0.28-0.69)
Cakes, sweet buns, muffins or scones	1.00	1.05 (0.79-1.40)	1.11 (0.84-1.49)	1.23 (0.93-1.62)
Ice-cream, ice-confection, or frozen yoghurt	1.00	1.05 (0.74-1.50)	1.06 (0.74-1.53)	1.39 (1.00-1.95)
Soft drink, non-diet	1.00	0.91 (0.67-1.22)	0.88 (0.64-1.20)	1.04 (0.78-1.39)
Thick shake or milk shake	1.00	1.46 (0.81-2.62)	1.13 (0.60-2.13)	2.41 (1.39-4.26)
Flavoured milk or smoothie	1.00	0.85 (0.53-1.36)	0.89 (0.55-1.44)	1.40 (0.92-2.12)

* Adjusted by age and sex.

Table 5: Test-retest reliability of overall takeaway foods and 22 takeaway food measures

	Kappa coefficient*	% Crude agreement
Overall takeaway foods	0.71	62.9
"Healthy" items		
Sushi	0.71	77.8
Fruit or vegetable juice	0.59	58.3
Soft drink, diet	0.58	63.9
Asian-style noodles	0.54	75.0
Sandwiches	0.50	55.6
Salad (including fruit salad)	0.46	51.4
Kebab	0.41	77.1
Fried rice	0.36	66.7
Pasta	0.17	65.7
"Less healthy" items		
Hamburger	0.66	63.9
Pizza	0.61	69.7
Savoury pies, sausage rolls or pastries	0.60	69.4
Cakes, sweet buns, muffins or scones	0.58	61.1
Fried fish or fried seafood†	0.57	65.7
Fried chicken†	0.53	68.5
Soft drink, non-diet	0.53	63.9
Potato chips, fries or wedges	0.50	52.8
Curry	0.50	61.1
Ice-cream, ice-confection, or frozen yoghurt	0.50	52.8
Fried spring roll, dim sim or wonton	0.46	72.2
Flavoured milk or smoothie	0.45	75.0
Thick shake or milk shake	0.34	72.2

* Original categories for each measure were used to calculate kappa coefficients: overall takeaway foods had eight categories; the 22 specific takeaway items had seven categories.

Figure 1: Frequency of takeaway food consumption among Australian adults aged between 25 and 64 years (N = 859)